

62305/79287

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

Serial Number: 09/782,215
Filing Date: February 13, 2001
Applicant: Microfab Technologies, Inc.
Title: Ink-Jet Printing of Gradient-Index Microlenses
Inventors: Cox, W. Royall and Chi Guan
Examiner: Markham, Wesley D.
Group: 1762

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

RECEIVED
DEC - 2 2003
TECHNOLOGY CENTER 1700

REQUEST FOR TIME EXTENSION AND AMENDMENT

Applicants request a three month time extension in which to respond to the Office action mailed June 4, 2003. A check in the amount of \$475.00 is attached hereto in payment of a three month time extension. If additional fees are required, please charge Deposit Account No. 12-1781.

Amendment

In the specification.

Please amend pages 13 and 14 as follows:

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01 FC:2253
475.00 DP

Some specific commercial materials which have been suitable for forming axial gradient index microlenses include Summers Optical No. SK9 polymeric fluid (Refractive Index 1.49) by Summers Optical, Inc., P.O. Box 162, Fort Washington, PA, 19034; Norland No. NOA-73 polymeric fluid (Refractive Index 1.56) by Norland Products, Inc., P.O. Box 7145, New Brunswick, NY, 08902; and Epotek No. OG146 polymeric fluid (Refractive Index 1.48) by Epoxy Technology, Inc., 14 Fortune Dr., Billerica, MA, 01821.

It is believed that at room temperature viscosity should not be over 1000 centipoise and the viscosity must be reduced below about 40 centipoise by heating up to perhaps as high as 150 to 200° centigrade in the printhead or by the use of organic solvents which then must be heated to drive them out of the finished product. The preferred way is to operate with polymeric materials having 100% solids. The removal of solvents results in shrinkage and distortion. Ray-trace modeling for lens geometry is preferably performed using a Zemax, optical design program version 9.0, Focus Software, Inc., P.O. Box 18228, Tucson, AZ. If it is desired to apply a de-wetting coating to the surface of the substrate to inhibit spreading, a suitable material is known as FC-724 de-watering liquid by 3M Corporation, St. Paul, MN. It is believed to be a fluorinated acrylate de-watering liquid which adheres to glass or plastic surfaces.